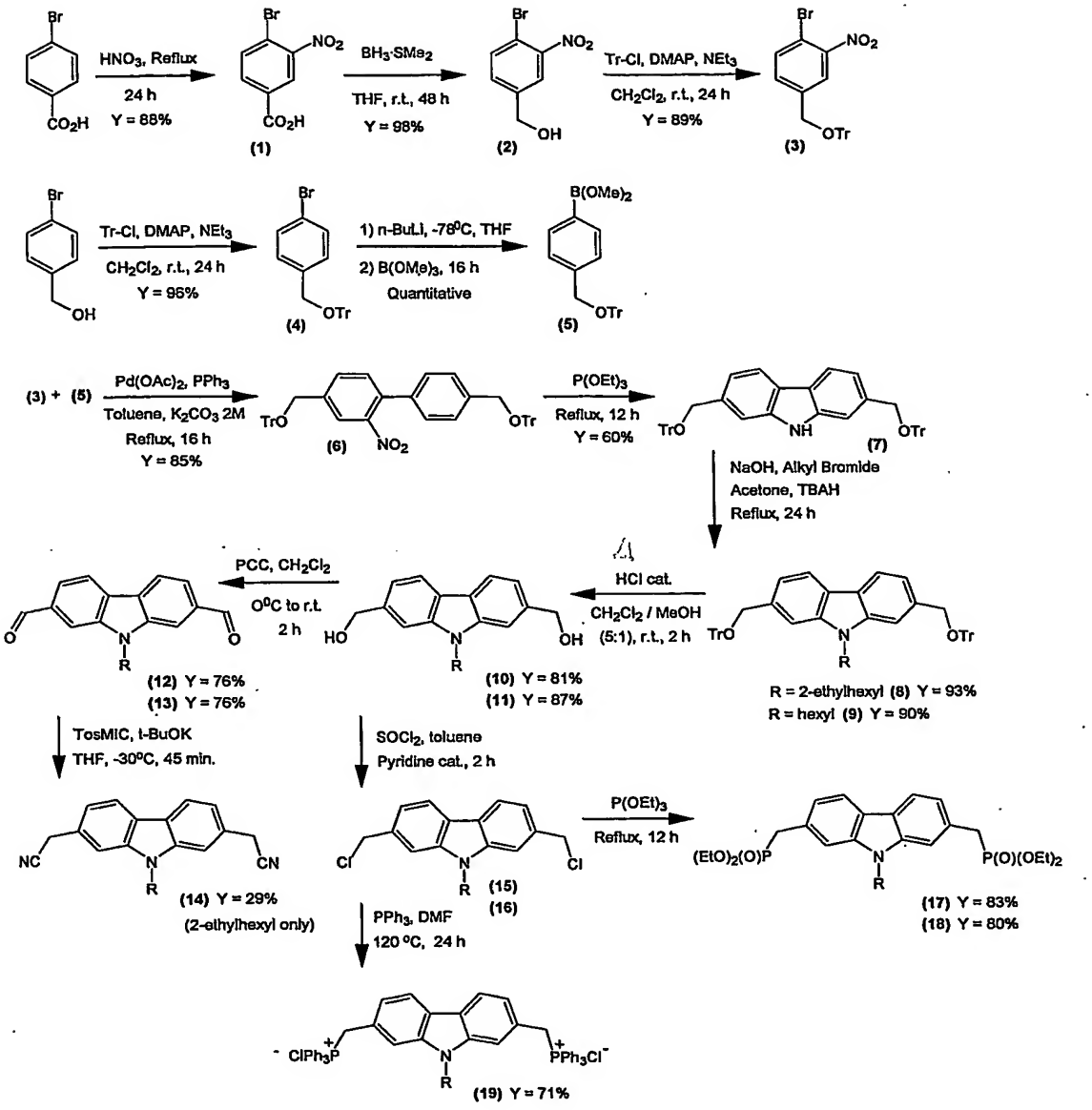
HNO3, Reflux
24 h
Y = 88%
(1)
BH3·SMe2
THF, r.t., 48 h
Y = 98%
(2)
Tr-Cl, DMAP, NEt3
CH2Cl2, r.t., 24 h
Y = 89%
(3)
Tr-Cl, DMAP, NEt3
CH2Cl2, r.t., 24 h
Y = 96%
(4)
1) n-BuLi, -78°C, THF
2) B(OMe)3, 16 h
Quantitative
(5)
(3) + (5)
Pd(OAc)2, PPh3
Toluene, K2CO3 2M
Reflux, 16 h
Y = 85%
(6)
P(OEt)3
Reflux, 12 h
Y = 60%
(7)
NaOH, Alkyl Bromide
Acetone, TBAH
Reflux, 24 h
HCl cat.
CH2Cl2 / MeOH
(5:1), r.t., 2 h
PCC, CH2Cl2
0°C to r.t.
2 h
(12) Y = 76%
(13) Y = 76%
(10) Y = 81%
(11) Y = 87%
R = 2-ethylhexyl (8) Y = 93%
R = hexyl (9) Y = 90%
TosMIC, t-BuOK
THF, -30°C, 45 min.
(14) Y = 29%
(2-ethylhexyl only)
SOCl2, toluene
Pyridine cat., 2 h
(15)
(16)
P(OEt)3
Reflux, 12 h
(17) Y = 83%
(18) Y = 80%
PPh3, DMF
120 °C, 24 h
(19) Y = 71%

Figure 1

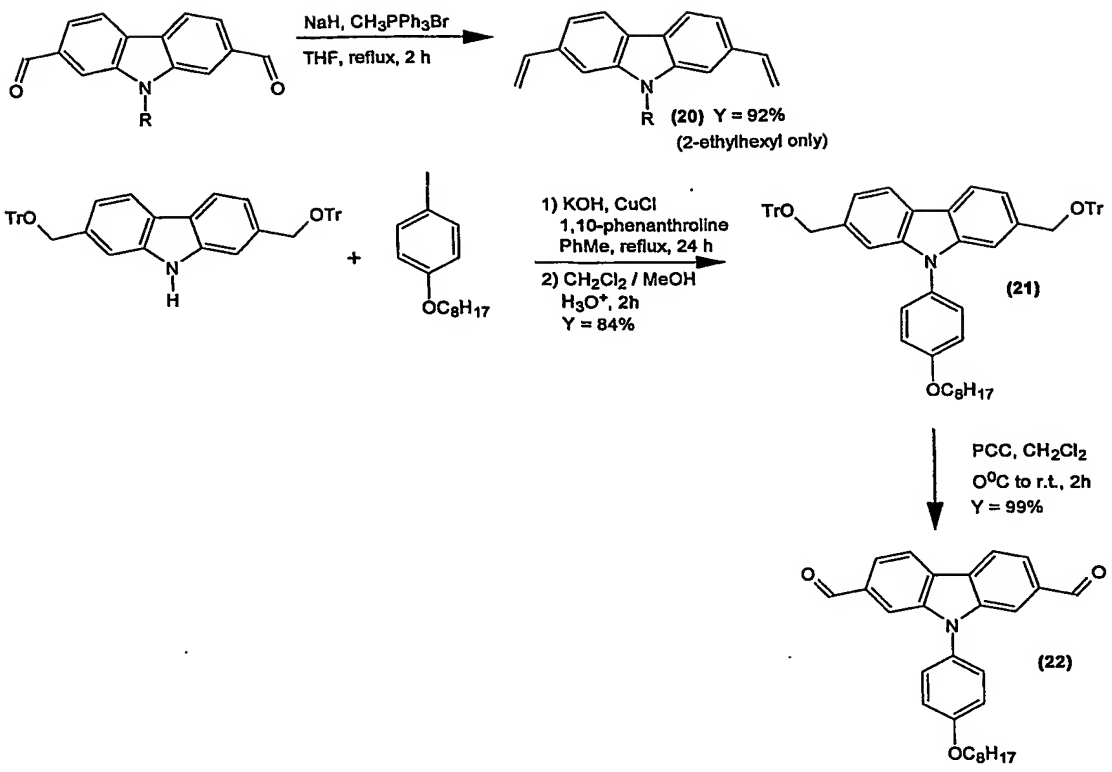

Figure 1 (continued)

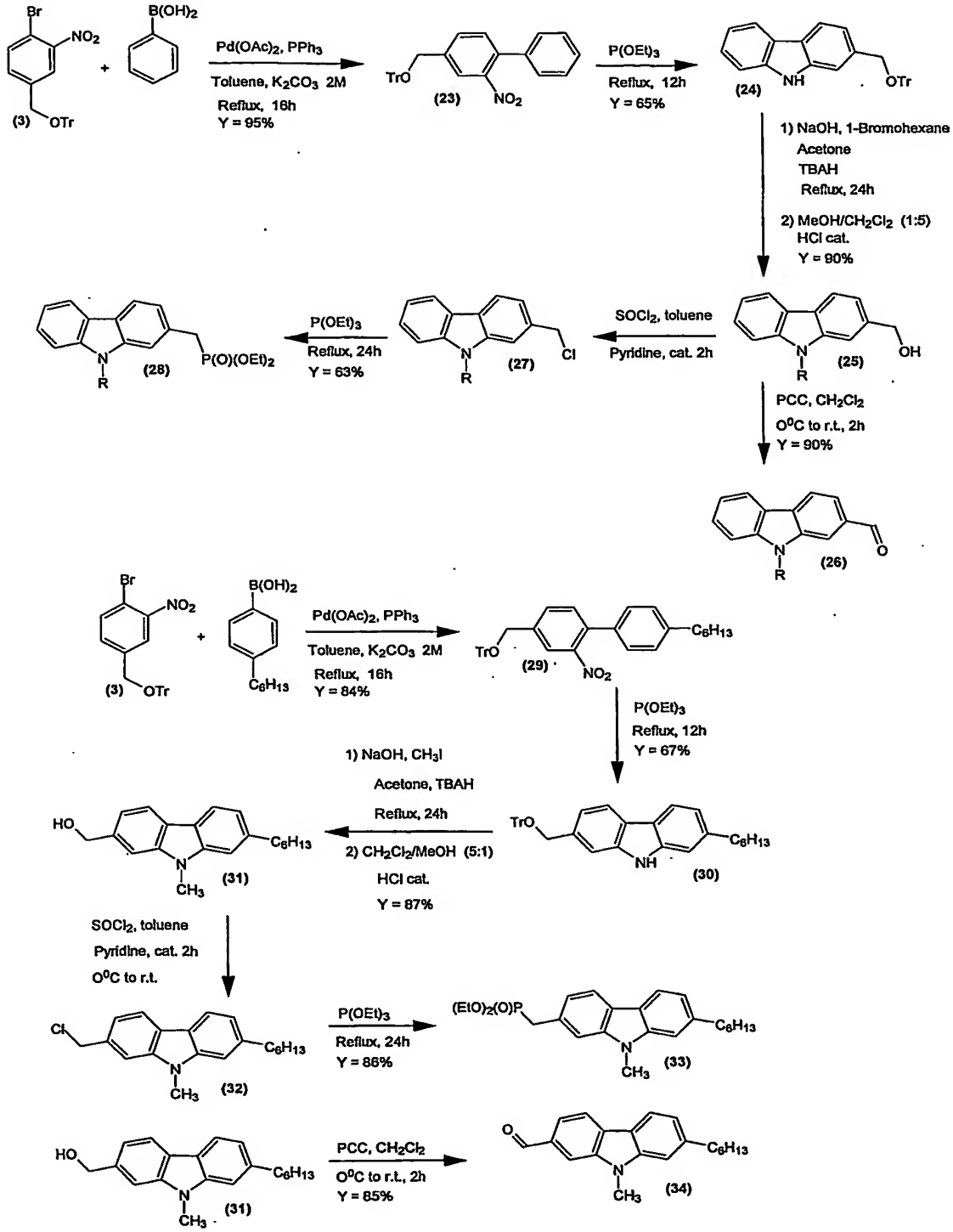
Br
NO2
B(OH)2
(3) OTr
Pd(OAc)2, PPh3
Toluene, K2CO3 2M
Reflux, 16h
Y = 95%
TrO
(23) NO2
P(OEt)3
Reflux, 12h
Y = 65%
(24) NH OTr
1) NaOH, 1-Bromohexane
Acetone
TBAH
Reflux, 24h
2) MeOH/CH2Cl2 (1:5)
HCl cat.
Y = 90%
(25) N R OH
SOCl2, toluene
Pyridine, cat. 2h
(27) N R Cl
P(OEt)3
Reflux, 24h
Y = 63%
(28) N R P(O)(OEt)2
PCC, CH2Cl2
0°C to r.t., 2h
Y = 90%
(26) N R O
C6H13
Pd(OAc)2, PPh3
Toluene, K2CO3 2M
Reflux, 16h
Y = 84%
(29) TrO NO2 C6H13
P(OEt)3
Reflux, 12h
Y = 67%
(30) TrO NH C6H13
1) NaOH, CH3I
Acetone, TBAH
Reflux, 24h
2) CH2Cl2/MeOH (5:1)
HCl cat.
Y = 87%
(31) HO N CH3 C6H13
SOCl2, toluene
Pyridine, cat. 2h
0°C to r.t.
(32) Cl N CH3 C6H13
P(OEt)3
Reflux, 24h
Y = 86%
(33) (EtO)2(O)P N CH3 C6H13
(31) HO N CH3 C6H13
PCC, CH2Cl2
0°C to r.t., 2h
Y = 85%
(34) O N CH3 C6H13

Figure 2

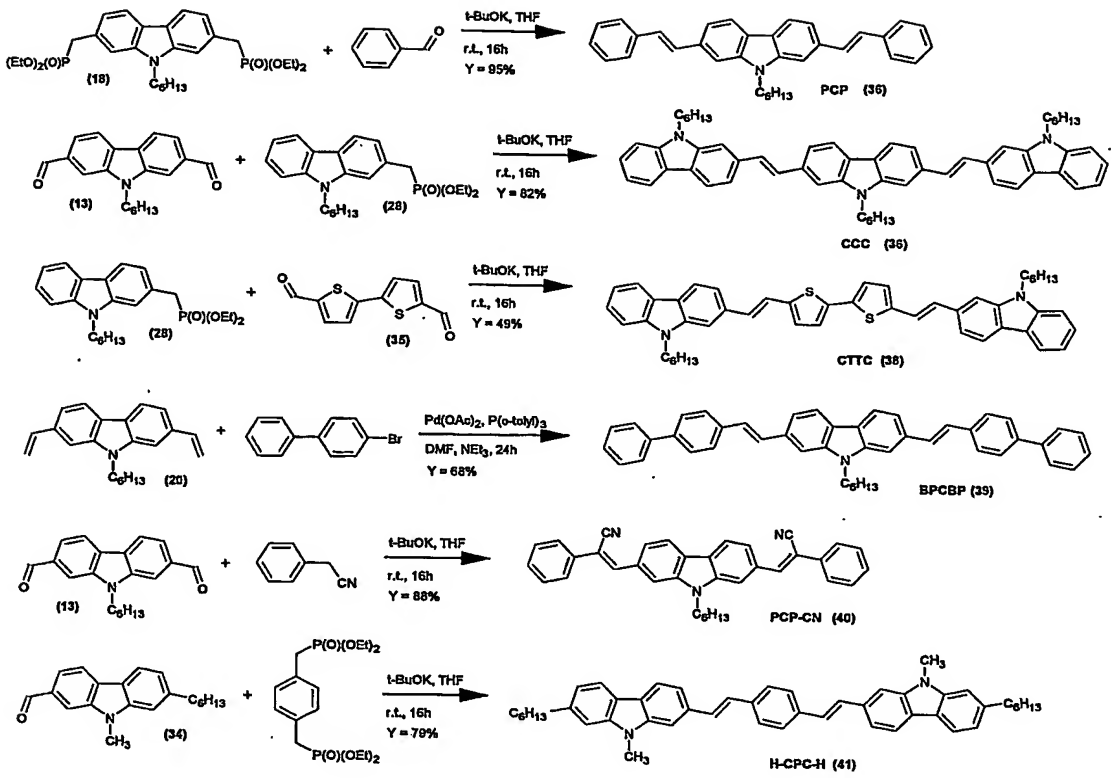
t-BuOK, THF
r.t., 16h
Y = 95%
PCP (36)
t-BuOK, THF
r.t., 16h
Y = 82%
CCC (35)
t-BuOK, THF
r.t., 16h
Y = 49%
CTTC (38)
Pd(OAc)2, P(o-tolyl)3
DMF, NEt3, 24h
Y = 68%
BPCBP (39)
t-BuOK, THF
r.t., 16h
Y = 88%
PCP-CN (40)
t-BuOK, THF
r.t., 16h
Y = 79%
H-CPC-H (41)

Figure 3

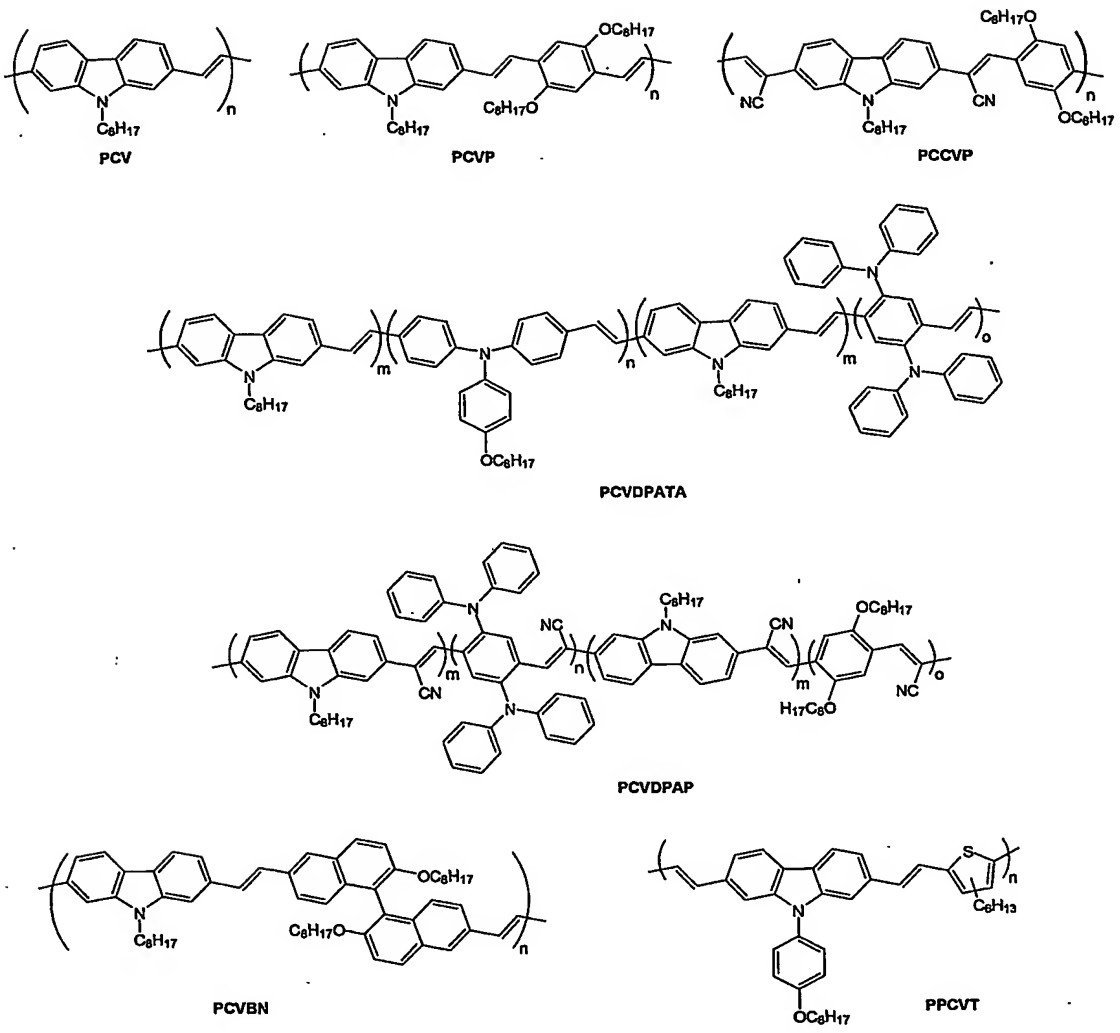

Figure 4

Polymer	Yields[d]	M_n (kDa)	I_p (M_w/M_n)
Example 7 (PCV[a])	10		
Examples 8,9 (PCVP[b])	76	10.2	2.1
Example 8, 9 (PCVP[c])	61	10.5	4.6
Example 10 (PCCVP)	68	7.9	4.4
Example 11 (PCVDPATA)	51	10.2	3.7
Example 12 (PCVDPAP)	66	28.2	4.3
Example 13 (PCVBN)	24	4.1	1.2
Example 14 (PPCVT[a])	10		

[a] PCV and PPCVT are insoluble in THF

[b] Synthesized by Wittig reaction

[c] Synthesized by Wittig-Horner reaction

[d] Calculated from the soluble part of the polymer

Figure 5

Polymer	Solution λ_{max}		Thin film λ_{max}		Φ_F
	Abs.	Emi.	Abs.	Emi.[a]	
PCV (Example 7)	426	469 (499)	430		0.52
PCVP (Examples 7,8)	456	505 (539)	456		0.40
PCCVP (Example 10)	481	546 (586)	502	658	0.67
PCVDPATA (Example 11)	440	526	440		0.27
PCVDPAP (Example 12)	472	547 (655)	500	655	0.26
PCVBN (Example 13)	396	440 (467)	398		0.56
PPCVT (Example 14)					

[a] Solid state fluorescence can only be observed for PCCVP and PCVDPAP

Figure 6

Oligomer	λ_{max} sol.	$E_{peak\ ox}$ ($E_{onset\ ox}$) V vs. SCE	$E_{g\ optical}$ (eV)
PCP (Example 1)	376	1.26 (1.09)	2.92
CCC (Example 2)	402	1.03 (0.91)	2.73
CTTC (Example 3)	453	0.92 (0.81)	2.36
BPCBP (Example 4)	392	1.24 (1.03)	2.78
PCP-CN (Example 5)	399	1.58 (1.41)	2.63
H-CPC-H (Example 6)	399	0.99 (0.76)	2.78

Figure 7

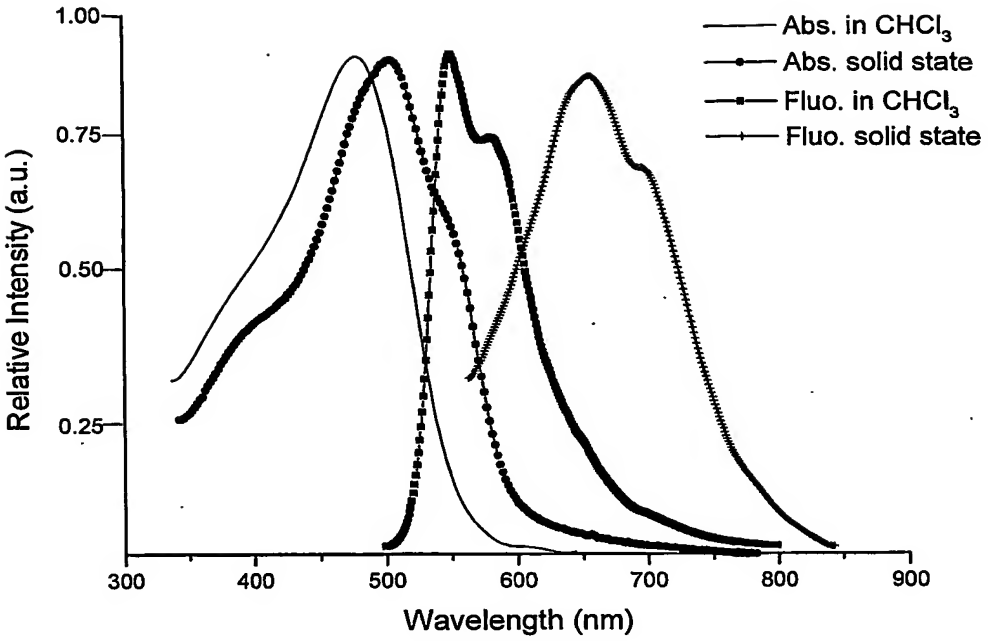
1.00
0.75
0.50
0.25
Relative Intensity (a.u.)
300
400
500
600
700
800
900
Wavelength (nm)
Abs. in CHCl3
Abs. solid state
Fluo. in CHCl3
Fluo. solid state

Figure 8